

Development of an ambient lighting monitoring system for radiological image viewing application

Abstract

Ambient lighting plays a very important role in radiological image viewing environment. Excessive room ambient lighting (or illuminance) degrades image contrast, introducing veiling glare, diffuse reflectivity on the viewing station and thus, leading to clinical misinterpretation. This becomes more critical in softcopy display system where a low level of ambient light is essential. In current environment, the control of the ambient lighting level was implemented qualitatively based on individual radiologist's experience. Thus, our aim here is to develop a monitoring system to assist the radiologists in deciding an adequate lighting level during reporting. For the purpose of light detection, the system used OSD5-5T photodiode. The indication is done by using light emitting diodes where red indicates the level is above the preset values and green shows that the level is in adequate range. Amplifier, filter, and comparator circuits were built on a single quad operational amplifier LM324N. To ensure proper output is produced, the system was calibrated with an ambient lighting using a photometer. From the calibration process, it was found that the output voltage is directly proportional to the ambient lighting level. By employing the system in the radiological viewing room, ambient lighting level can be monitored and adjusted effectively.

Keywords — Illuminance, ambient lighting, image display, film viewing, radiography